



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

December 14, 1992

Project No. 679

ORGANIZATION: Atomic Energy of Canada, Ltd., Technologies (AECLT)

SUBJECT: MEETING WITH AECL TECHNOLOGIES TO DISCUSS THE CANADIAN  
DEUTERIUM URANIUM (CANDU) 3 PREAPPLICATION REVIEW

On October 15, 1992, members of the Advanced Reactors Project Directorate (PDAR) of the Office of Nuclear Reactor Regulation (NRR) and members of the Office of Nuclear Regulatory Research (RES) met with representatives of AECLT to discuss the NRC's preapplication review plan for CANDU 3. The meeting was requested by AECLT. A list of attendees is included as Enclosure 1. The meeting agenda is provided in Enclosure 2.

Jim Dyer, PDAR Director, opened the meeting by stating that even though the Commission advocates early interaction with potential standard design certification (SDC) applicants, the CANDU 3 preapplication review scope, content, and schedule remain under the purview of the NRC. PDAR will, however, take into consideration suggestions or recommendations made by AECLT regarding the CANDU 3 preapplication review.

Louis Rib, AECLT, stated that the impetus for the meeting was a September 23, 1992, letter from Jim Dyer to Denny Shiflett, AECLT, regarding the availability of proprietary information on the CANDU 3 design. This letter indicated that PDAR had reviewed the material already submitted for review of the CANDU 3 design, and noted that some pertinent proprietary information would be needed to complete the preapplication review on a definitive schedule. AECLT believed that the NRC had previously decided in a letter dated April 11, 1991, that the NRC needed no additional submittals to complete the preapplication review. Janet Kennedy, PDAR, informed AECLT that the April 11, 1991, letter did not state that the NRC would not require any additional information. In the September 23, 1992, letter, the staff identified a need for an updated CANDU 3 Safety Analysis Report, information regarding fuel performance acceptance criteria, and information regarding CANDU 3 severe accident analyses. In addition, a request was previously issued regarding experimental database information in support of the CANDU 3 design.

In Enclosure 2, as Attachment 1 to the meeting agenda, AECLT provided their comments on the proposed CANDU 3 preapplication review scope. For each chapter of the preapplication review, AECLT identified what documents they have submitted that address the subject area. One of the more sensitive areas of review to AECLT is the area of severe accidents. AECLT inquired as to where the NRC requirements are contained for severe accidents. Tom Cox, PDAR, indicated that the NRC's policies on severe accidents are contained in NUREG-1226, "Development and Utilization of the NRC Policy Statement on the Regulation of Advanced Nuclear Power Plants," and in the Commission's "Policy

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Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants." Tom Cox also noted that the NRC expects AECLT to evaluate event sequences involving substantial core damage at the preapplication review stage. AECLT stated that no severe accident analysis has been done for CANDU 3. As such, AECLT would like to see this issue remain open for the preapplication review. AECLT did note that they have submitted to the NRC a document entitled "CANDU 3 Systematic Review of the Plant Design for Identification of Initiating Events," which identifies 84 initiating events (and associated event trees) with a potential for release of radionuclides from their normal location. PDAR informed AECLT that the issue of severe accidents would have to be addressed at the preapplication stage. The staff believes that this information is necessary for the NRC to make key recommendations on the licensability of the CANDU 3 design in the U.S.

For the issue of design codes and standards, Jim Dyer informed AECLT that NRC will be looking at whether the CANDU 3 design complies with U.S. codes and standards. Janet Kennedy noted that the CANDU 3 documentation available to the NRC does not identify whether or not the design meets U.S. requirements. The documentation identifies what Canadian design standards apply, but there is no comparison of Canadian standards with U.S. standards. This is an area of focus for the preapplication review.

Another area of concern to AECLT is the issue of experimental database information in support of the CANDU 3 design. The major NRC effort to evaluate the experimental databases in support of the CANDU 3 design is being performed by RES. Although RES initiated the work, Jim Dyer informed AECLT that NRR has identified this as an issue for the preapplication review. At the preapplication stage, PDAR wants to identify any major areas for which the design is not supported by experimental data. Development of experimental data to support unique design features could be a long lead time item. PDAR wants to inform AECLT early on about areas needing more data support.

AECLT noted that their belief is that CANDU 3 work being performed by the Office of Nuclear Regulatory Research should be considered separate from the preapplication review work being performed by NRR. One of the major areas of concern for AECLT is the issue of fee recovery. Jim Dyer stated that, at this time, none of the current work ongoing in RES is fee recoverable. Jim Dyer also noted that he understood AECLT's concern regarding research work, but that NRR is involved in the work ongoing at RES and is counting on RES to supply information in support of PDAR's preapplication review. Examples of RES work that PDAR will use in the preapplication review is the experimental database review, and review of the computer codes used in the design of the CANDU 3. Ed Throm, PDAR, noted that the computer codes are necessary for the preapplication review for the NRC to make a judgment on whether or not the accident analysis presented by AECL is conservative and the assumptions made are defensible.

As identified in Attachment 1 to Enclosure 2, AECLT wanted to add a chapter to the preapplication review scope to address areas for which the CANDU 3 design

does not meet the specific NRC requirement, but for which the design provides equivalent safety. The equivalent safety issues have been submitted to the NRC in the form of Technology Transfer Reports (TTRs). Tom Cox stated that PDAR would not address each TTR in a separate chapter of the preapplication review, but would address the TTRs as the subject area arose in the various preapplication review issues. For example, the TTR on emergency core cooling would be addressed in the chapters on special safety systems and accident analysis. PDAR did agree to consider addressing specific NRC requirements which AECLT has stated are not technically relevant to CANDU 3 such as certain Regulatory Guides and 10 CFR requirements. These requirements were identified in previous AECLT submittals to the NRC.

Finally, PDAR addressed some open issues remaining from previous meetings or correspondence. The first was the Canadian export permit for transmittal of the Canadian codes to the NRC. AECLT stated that although the export permit had been signed, they are currently trying to find out what further action needs to be taken to get the codes transferred to the NRC. AECLT believed it will be straightened out by November 1, 1992. Second, there is a previous request on the docket for information regarding experimental databases in support of the CANDU 3 design. AECLT stated that they are working on compiling the requested information, and the first response will be forthcoming soon. Lastly, AECLT inquired about the status of the preapplication review schedule. Jim Dyer told AECLT that a Commission paper on the preapplication review schedules was in concurrence. The schedules in this paper attempt to address the needs of each of the preapplicants. AECLT stated that if for some reason it appeared that the schedules would not be met due to resource constraints or some unknown factor, they would like the NRC to at least address the equivalent safety issues identified in the various TTRs that have been submitted. Jim Dyer said that the staff would consider AECLT's recommendation.

Original signed by:

Janet L. Kennedy, Project Manager  
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Associate Directorate for Advanced Reactors  
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Enclosures:

1. List of Attendees
2. Meeting Agenda

cc w/enclosures:  
See next page

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CANDU

Project No. 679

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MEETING WITH AECL TECHNOLOGIES TO DISCUSS  
CANDU 3 PREAPPLICATION REVIEW

<u>Name</u>	<u>Affiliation</u>
Janet L. Kennedy	NRC/NRR/ADAR/PDAR
Edward D. Throm	NRC/NRR/ADAR/PDAR
Robert E. DePriest	NRC/NRR/ADAR/PDAR
Thomas H. Cox	NRC/NRR/ADAR/PDAR
James E. Dyer	NRC/NRR/ADAR/PDAR
Ralph Meyer	NRC/RES
Zoltan Rosztoczy	NRC/RES
John C. Lane	NRC/RES
David Ebert	NRC/RES
Michael H. Fletcher	AECL Technologies
Robert L. Ferguson	AECL Technologies
Louis N. Rib	AECL Technologies
Raymond W. Durante	AECL Technologies

CANDU 3 PREAPPLICATION REVIEW  
AECLT-NRC MEETING AGENDA

October 15, 1992

1. INTRODUCTION

1.1 Participants

1.2 Discussion Issues

- A mutually-agreeable scope for the preapplication review has not been established.
- AECLT recommendations for preapplication review have not been included.
- The NRR preapplication review schedule has not been established and NRR has indicated further delays.
- The NRC/RES roles in the preapplication review and NRC/RES role in NRR's research program are not kept separated.
- NRR's recent requests for additional information appear to co-mingle such requests for the research program and the preapplication review.

1.3 Purpose:

To discuss these issues and arrive at (1) a mutually-agreeable working outline for the review, (2) a proposed schedule for the review, and (3) a methodology for continuing the review and the research program independently.

2. DISCUSSION

- 2.1 Attachment 1 - Comments on NRC's PSER outline (Mtg. June 29, 1992) to include AECLT's recommendations (ltr Nov. 19, 1991).
- 2.2 Role of RES in PSER development.
- 2.3 Separation of RES role in PSER from research role.
- 2.4 Role of proprietary information in review (Attachment 2).



2.5 Role of recent RAI's (June 29, 1992 and September 23, 1992) in the preapplication review.

2.6 NRC schedule for preapplication review.

2.7 Future Actions

- Mutually-agreeable scope of review
- SECYs re Policy Issues and Schedule

### 3. SUMMARY AND CONCLUSIONS

COMMENTS ON NRC/NRR PSER OUTLINE

<u>Chapter</u>	<u>Title/Content</u>
1	INTRODUCTION AND SUMMARY <ul style="list-style-type: none"><li>- Review Criteria</li><li>- Policy Issues</li><li>- Outstanding Issues</li><li>- New Requirements</li></ul>
2	DESIGN CODES AND STANDARDS (NRC Issue ?) <ul style="list-style-type: none"><li>- CSA Standards (8/29/89)</li></ul>
3	SEISMIC DESIGN (TTR-413: Ch. 2, CSR/SDG-002)
4	SAFETY CLASSIFICATION OF STRUCTURES, SYSTEMS AND COMPONENTS <ul style="list-style-type: none"><li>- Group 1 and Group 2 Philosophy (CSR/SDG-004, Ltr 09/16/92)</li><li>- TTR-413 - Classification of SSC, Ch. 3</li><li>- TTR-410 - Ch. 2 &amp; 3</li></ul>
5*	REACTOR <ul style="list-style-type: none"><li>- Coefficients of Reactivity (future TTR)</li><li>- Reactivity Control Devices Used During Normal Operation</li><li>- Materials</li><li>- Horizontal Pressure Tubes (TTR-291)</li><li>- RCS Pressure Boundary</li><li>- Past Experience and Problem Areas</li><li>- ASME Code Relief Requests (Mat'l &amp; Rolled Joint)</li></ul>
6	SPECIAL SAFETY SYSTEMS <ul style="list-style-type: none"><li>- Containment System (TTR-411 future)</li><li>- Emergency Core Cooling System (TTR-409 &amp; 276)</li><li>- Shutdown System No. 2 (TTR-306)</li><li>- Shutdown System No. 2 (TTR-306)</li></ul>

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\* = Suggested modifications/additions to NRC's PSER outline



- 7 ON-LINE FUELING AND FUEL HANDLING (TTR-305)
- 8 PRODUCTION AND CONTROL OF TRITIUM (REP 2/91)
- 9\* INSTRUMENTATION AND CONTROL (TTR-306)
- 10\* ELECTRICAL SYSTEMS (TTR-423, TTR-429)
- 11 MAIN CONTROL ROOM AND SECONDARY CONTROL AREA (TTR-412)
- 12 TESTING REQUIREMENTS (NRC issue?)
  - Development, Verification and Validation of Analytical Tools
  - Development Tests
- 13 SAFETY ASSESSMENT
  - Accident Analysis (Classification of DBAs and accident initiators - systematic review)
  - Source Term (TTR-384)
  - Containment Performance (TTR-411 future)
- 14\* PROBABILISTIC SAFETY ASSESSMENT (CPSA, Systematic Review)
- 15\* SPECIFIC ISSUES - Equivalent Safety Findings
 

- TTR-429	- Comparison w/SECY 90-016
- TTR-423	- Comparison w/NRC GDC
- TTR-410	- Primary Heat Transport System
- TTR-409	- Emergency Core Cooling
- TTR-412	- Auxiliary Support Systems (future)
- TTR-411	- Containment Design & Performance (future)
- TTR-	- Reactivity Coefficients (future)
- 16\* NRC REQUIREMENTS NOT TECHNICALLY RELEVANT TO CANDU 3 SDC (LTR 11/19/91)
- 17\* SDC APPLICATION DOCUMENTATION REQUIREMENTS BEYOND PART 52.47
- 18\* CONCLUSION

#### APPENDIX CANDU 3 DESIGN DESCRIPTION

## ATTACHMENT 2

10/14/92

CANDU 3 PREAPPLICATION REVIEW  
INFORMATION SUBMITTAL SCHEDULE

<u>TITLE</u>	<u>SUBMITTAL DATE</u>
List of CANDU Documents Requested by NRC	07/08/89C
Unique Aspects of the Technical Characteristics of CANDU 3	07/27/89C
CANDU 3 Technical Outline	07/27/89C
CANDU 3 Conceptual Safety Report (Vols. 1 & 2)	08/29/89C
Canadian Codes & Standards (Canadian Standards Association) (2 Vols.)	11/14/89C
CANDU 3 Conceptual Probabilistic Safety Assessment	11/14/89C
CANDU 3 Technical Description (Vols. 1 & 2)	11/14/89C
Atomic Energy Control Board Regulations and Supporting Documents Applicable to CANDU 3	11/14/89C
Operating Policies and Principles - Supporting Documents Applicable to CANDU 3	11/14/89C
Operating Policies and Principles - CANDU 6 at Point Lepreau (Unit 1)	11/14/89C
CANDU 6 Probabilistic Safety Study Summary (July 1988)	12/19/89C
CANDU Fuel Channel Technology (Abstract)	02/07/90C
CANDU LOCA Analysis Technology (Abstract)	10/90C
CANDU 3 Licensing Review Basis Document (LRBD)	01/91C
Canadian Tritium Experience	02/91C
CANDU Fuel Channel Technology (TTR 291)	03/91C
CANDU On-Power Fueling Technology (TTR-305)	03/91C

CANDU 3 PREAPPLICATION REVIEW  
INFORMATION SUBMITTAL SCHEDULE

<u>TITLE</u>	<u>SUBMITTAL DATE</u>
CANDU LOCA Analysis Technology (TTR-276)	04/91C
CANDU Shutdown Systems Technology (TTR-306)	05/91C
Recommendations for Pre. Application Review Plan	11/91C
o NRC Requirements Not Technically Relevant to CANDU 3 Standard Design Certification	
o NRC guidance Not Technically Relevant to CANDU 3 Standard Design Certification	
CANDU 3 Technical Outline (Rev. 10)	04/92C
CANDU 3 Systematic Review of the Plant Design for Identification of Initiating Events	06/92C
ESI: Primary Heat Transport System (TTR-410)	07/92C
Comparison of CANDU 3 with NRC Positions for Evolutionary Light Water Reactor (LWR) Certification Issues in SECY-90-016 (TTR-429)	07/92C
CANDU 3 and the U.S. NRC General Design Criteria (TTR-423)	07/92C
CANDU Source Term Calculation (TTR-384)	09/92C
ESI: Emergency Core Cooling (TTR-409)	09/92C
ESI: Classification of Systems and Components (TTR-413)	09/92C
ESI: Auxiliary Support Systems (TTR-412)	TBD
ESI: Containment Design and Performance (TTR-411)	TBD
ESI: Reactivity Coefficients	TBD

C = Completed Action  
TBD = To Be Determined

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